

# Operating Instructions

CCTV Cameras  
**WV-BP120/WV-BP124**



WV-BP120



(Lens : option)

WV-BP124

**Panasonic®**

Before attempting to connect or operate this product,  
please read these instructions completely.



## CAUTION

RISK OF ELECTRIC SHOCK  
DO NOT OPEN



**CAUTION:**  
TO REDUCE THE RISK OF ELECTRIC SHOCK, DO  
NOT REMOVE COVER (OR BACK). NO USER SER-  
VICEABLE PARTS INSIDE.  
REFER SERVICING TO QUALIFIED SERVICE PER-  
SONNEL.



SA 1965

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



SA 1966

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

For U.S.A.

### Warning:

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the instruction manual, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

The serial number of this product may be found on the top of the unit.

You should note the serial number of this unit in the space provided and retain this book as a permanent record of your purchase to aid identification in the event of theft.

Model No. \_\_\_\_\_

Serial No. \_\_\_\_\_

### WARNING:

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

## CONTENTS

PREFACE.....	2
FEATURES.....	2
PRECAUTIONS.....	3
MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS.....	4
CONNECTIONS.....	7
LENS.....	9
FOCUS OR FLANGE-BACK ADJUSTMENT.....	15
INSTALLATION OF CAMERA.....	16
PREVENTION OF BLOOMING AND SMEAR .....	16
LENS MAINTENANCE AND CLEANING .....	16
SPECIFICATIONS.....	17
STANDARD ACCESSORY.....	18
OPTIONAL ACCESSORIES.....	18

## PREFACE

Panasonic's WV-BP120 series cameras introduce a new level of high picture quality through the use of a 1/3 inch interline transfer CCD having 512 horizontal pixels (picture elements). High performance-to-cost ratio is achieved through the use of newly developed Sync IC's and ability to shoot indoor scenes with a fixed iris lens by use of Electronic Light Control (ELC) function.

## FEATURES

- Minimum illumination of 0.15 lx at F1.4 and Signal-to-noise ratio of 46 dB by employing a 1/3 inch interline transfer CCD image sensor with 512 (H) x 492 (V) pixels.
- 380 lines of horizontal resolution
- Either optional standard C-mount or Special C-mount (CS-mount) auto iris control lens can be used with.
- Selectable auto iris control signal for the lens either a video signal or DC control signal.
- Line-locked Sync or switchable Multiplexed Vertical Drive (VD2) automatically.

# PRECAUTIONS

- **Do not attempt to disassemble the camera.**

To prevent electric shock, do not remove screws or cover. There are no user-serviceable parts inside.

Refer servicing to qualified service personnel.

- **Handle the camera with care.**

Do not abuse the camera. Avoid striking or shaking it. The camera could be damaged by improper handling or storage.

- **Do not expose the camera to rain or moisture, or try to operate it in wet areas.**

Do take immediate action if ever the camera becomes wet. Turn power off and refer servicing to qualified service personnel. Moisture can damage the camera and also create the danger of electric shock.

- **Never face the camera toward the sun.**

Whether the camera is in use or not, never face it toward the sun. Do use caution when operating the camera in the vicinity of spot lights or other bright lights and light reflecting objects.

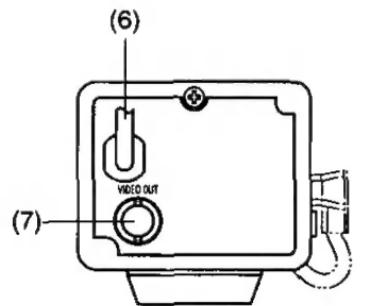
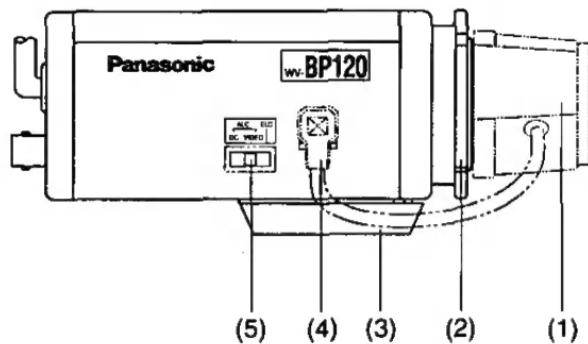
- **Do not operate the camera beyond its temperature, humidity or power source ratings.**

Do not use the camera in an extreme environment where high temperature or high humidity exist. Use the camera under conditions where temperatures are within -10°C - +50°C (14°F - 122°F), and humidity is below 90%. The input power source is 120V AC 60 Hz for WV-BP120 or 24V AC 60 Hz for WV-BP124.

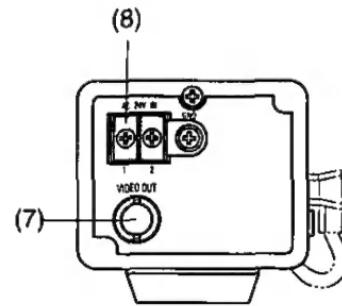
**Caution:**

To prevent fire or shock hazard, the UL listed wire VW-1, style 1007 should be used for the cable for AC 24V Input Terminal.

## MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS



WV-BP120



WV-BP124

#### **(1) Lens (Option)**

See pages 9, 10, 11 and 12 for details on lens selection.

#### **(2) Flange-back Adjusting Ring**

This ring is used to adjust the back focal length or picture focus by rotating this ring to clockwise for C-mount lens or counterclockwise for special C-mount (CS-mount) lens.

##### **Caution:**

1. Always set this ring to fully clockwise before mounting the lens.
2. Do not turn this ring too much to counterclockwise when the C-mount lens is mounted as this could damage the inner glass and CCD image sensor.

#### **(3) Camera Mounting Screw Hole**

This threaded hole (1/4" - 20) is used to mount the camera onto a mounting bracket or tripod.

#### **(4) Auto Iris Lens Connector**

This 4-pin female connector supplies the power and either video signal or DC control signal to the auto iris lens.

A 4-pin male connector, which can be mated with the camera's female connector, is supplied as a standard accessory (Part No. YFE4191J100).

This male connector can be installed on lenses which have incompatible type connector.

See page 13 for installation details.

#### **(5) Lens Selection Switch (ALC (DC/VIDEO)), ELC**

This switch is used to select the supplied auto iris control signal to the lens from the Auto iris lens Connector.

##### **DC:**

Choose this position when the auto iris control lens requiring DC control signal such as WV-LA2.8, WV-LA4R5C3A, WV-LA6B2, WV-LA9C3A, WV-LZ61/10, WV-LA12B2, WV-LA18, WV-LA36, WV-LA4510, WV-LA608, WV-LA1208, WV-LZ81/6A, WV-LZ81/10, WV-LZ83/6, is mounted on the camera.

##### **VIDEO:**

Choose this position when the auto iris control lens requiring video signal such as WV-LA8B, WV-LA16B, WV-LA25B, WV-LA50B, is mounted on the camera.

**ELC:**

Choose this position used with a fixed or manual iris lens.

See page 6 for more details.

**(6) AC Power cord****(7) Video Output Connector (VIDEO)**

A 1.0 V[p-p] 75Ω composite video signal is provided at this connector.

**(8) AC 24V In Terminal (AC 24V IN)**

This terminal accepts 24V AC power source (19.5V - 28V). Be sure to connect grounding lead to the GND terminal.

**Cautions:**

1. Connect this to a 24V AC class 2 power supply only.
2. To prevent fire or shock hazard, the UL listed wire VW-1, style 1007 should be used for the cable for AC 24V Input Terminal.

**ELC (Electronic Light Control)**

In this mode a continuously variable electronic shutter is employed to automatically control exposure times in the CCD Image Sensor, according to the incoming light level. With this mode selected, fixed or manual iris lens can be used instead of an ALC type lens.

**Cautions:**

1. Under bright conditions such as outdoors, use an ALC type lens as the ELC control range is not wide enough under these conditions.
2. Under certain unique lighting conditions, the following may appear :
  - Strong smear and/or blooming on high light objects such as spot lights or windows.
  - Noticeable flicker on the picture.Should these phenomena occur, use an ALC lens
3. When using in the ELC mode with a fixed iris lens, the depth of field of the image may be less than that obtained by using an ALC lens. Depth of field varies inversely with the iris opening. Thus, using this camera in the ELC mode with the fixed iris lens fully opened will result in less depth of field than if an ALC lens was used. (And distant objects in the picture might not be in focus).

# CONNECTIONS

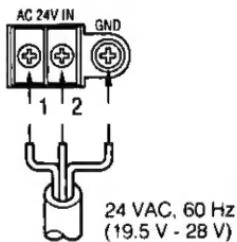
## Power Source

### ■ WV-BP120

Connect the AC Power Cord to a electrical outlet of 120V AC 60 Hz.

### ■ WV-BP124

1. A power supply of 24V AC 60 Hz is required.
2. Connect the power cable to the 24V AC In Terminal on the rear panel of the camera.



Recommended wire gauge sizes for 24V AC line.

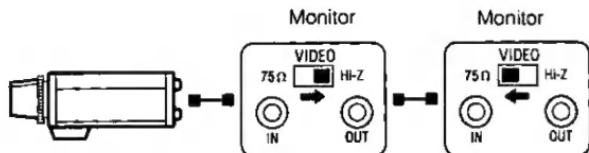
Copper wire size (AWG)	#24 (0.22mm <sup>2</sup> )	#22 (0.33mm <sup>2</sup> )	#20 (0.52mm <sup>2</sup> )	#18 (0.83mm <sup>2</sup> )	
Length of Cable (Approx.)	(m)	95	150	255	425
	(ft)	314	495	842	1403

## Caution:

To prevent fire or shock hazard, the UL listed wire VW-1, style 1007 should be used for the cable for AC 24V Input Terminal.

## Video Cable

1. It is recommended to use a video monitor whose resolution is at least equal to the camera's.
2. Terminate the camera output with 75Ω resistor at the furthest end of its cable run.
  - It is recommended to use 75Ω coaxial cable.
  - Always set the last monitor's termination switch to 75Ω, and set the termination switches of intermediate monitors to high impedance (Hi-Z) position.



- The maximum extensible coaxial cable length between the camera and the monitor is shown in the table 1. Since cable quality varies among manufacturers, verify video quality before final installation if maximum lengths are to be used.

**Table 1**

Type of coaxial cable	RG-59/U (3C-2V)	RG-6U (5C-2V)	RG-11/U (7C-2V)	RG-15/U (10C-2V)
Recommended maximum cable length	(m)	250	500	600
	(ft)	825	1,650	1,980
				2,640

### 3. Wiring precautions:

- Do not bend coaxial cable into a curve whose radius is smaller than 10 times the cables diameter.
- Never staple the cable-not even with circular staples. Mismatching will occur.
- Never crush or pinch the cable.

All of these will change the impedance of the cable and cause poor picture quality.

# LENSES

## 1. Selection of Lens

<Auto Iris Lenses>

Models Specifications	WV-LA2.8 (Wide Angle)	WV-LA6B2 (Wide Angle)	WV-LA12B2 (Standard)	WV-LA18 (Telephoto)	WV-LA36 (Telephoto)
Image Size	1/2" (6.4 (H) x 4.8 (V) mm)				
Focal Length	2.8 mm	6 mm	12 mm	18 mm	36 mm
Maximum Aperture Ratio	1 : 1.4	1 : 1.4	1 : 1.4	1 : 1.4	1 : 1.8
Angular Field of View	H	107.0° [87.5°]	56.8° [43.5°]	30.4° [22.8°]	20.4° [15.5°]
	V	88.0° [69.2°]	43.5° [33.0°]	22.8° [17.1°]	15.2° [11.5°]
Focusing Range	Adjusted by Camera			0.27 (m) - ∞ 0.89 (ft) - ∞	1 (m) - ∞ 3.3 (ft) - ∞
Mount	Special C-mount (CS-mount, 1"-32UN)				
Filter Size	None			ø37.5 mm, P = 0.5	ø37.5 mm, P = 0.5
Dimensions	ø43 x 34 mm (ø1-11/16" x 1-5/16")	ø43 x 36 mm (ø1-11/16" x 1-7/16")	ø43 x 36 mm (ø1-11/16" x 1-7/16")	ø43 x 41 mm (ø1-11/16" x 1-5/8")	ø43 x 41 mm (ø1-11/16" x 1-5/8")
Weights	65g (0.14 lbs.)	50g (0.11 lbs.)	40g (0.09 lbs.)	70g (0.15 lbs.)	80g (0.18 lbs.)

- [ ] indicates an angle used with the camera WV-BP120 Series.
- Dimensions and weights indicated are approximate.
- Specifications are subject to change without notice.

<Auto Iris Lenses>

Models Specifications	WV-LZ81/6A (Motorized Zoom)	WV-LZ81/10 (Motorized Zoom)	WV-LA4R5C3A (Wide Angle)	WV-LA9C3A (Standard)	WV-LZ61/10 (Motorized Zoom)
Image Size	1/2" (6.4 (H) x 4.8 (V) mm)			1/3" (4.8 (H) x 3.6 (V) mm)	
Focal Length	8.5 - 51 mm (6X)	8 - 80 mm (10X)	4.5 mm	9 mm	6 - 60 mm (10X)
Maximum Aperture Ratio	1 : 1.2 (Wide) 1 : 1.3 (Tele)	1 : 1.4 (Wide) 1 : 1.7 (Tele)	1 : 1.2	1 : 1.2	1 : 1.6 (Wide) 1 : 2.6 (Tele)
Angular Field of View 1/3"	H	Wide : 41.9° [31.4°] Tele : 7.2° [5.5°]	Wide : 44.6° [33.5°] Tele : 4.6° [3.5°]	56.4°	29.6°
	V	Wide : 31.3 [23.5°] Tele : 5.5° [4.1°]	Wide : 33.5° [25.2°] Tele : 3.5° [2.6°]	43.3°	22.2°
Focusing Range	1m - ∞ (3.3 ft - ∞)	1.1m - ∞ (3.6 ft - ∞)	Adjusted by Camera		1.2m - ∞ (4.0 ft - ∞)
Mount	CS-mount, 1"-32UN				
Filter Size	ø49 mm, P = 0.75	ø55 mm, P = 0.75	None		M35.5 mm, P = 0.5
Dimensions	86(W) x 62(H) 99(D) mm [3-3/8"(W) x 2-7/16"(H) x 3-7/8"(D)]	81(W) x 66(H) 114(D) mm [3-3/16"(W) x 2-5/8"(H) x 4-1/2"(D)]	ø43 x 38.5 mm (ø1-11/16" x 1-1/2")	ø43 x 38.5 mm (ø1-11/16" x 1-1/2")	71(W) x 52(H) 70.5(D) mm [2-13/16"(W) x 2-1/16" (H) x 2-3/4"(D)]
Weights	420g (0.93 lbs.)	450g (0.99 lbs.)	42g (0.09 lbs.)	40g (0.09 lbs.)	210g (0.46 lbs.)

- [ ] indicates an angle used with the camera WV-BP120 Series.
- Dimensions and weights indicated are approximate.
- Specifications are subject to change without notice.

<Auto Iris Lenses>

Models Specifications		WV-LA4510 (Wide Angle)	WV-LA608 (Wide Angle)	WV-LA1208 (Standard)	WV-LZ83/6 (Motorized Zoom)
Image Size		1/2" (6.4 (H) x 4.8 (V) mm)			
Focal Length		4.5 mm	6 mm	12 mm	8.5 - 51 mm (6X)
Maximum Aperture		1 : 1.0	1 : 0.75	1 : 0.8	1 : 0.8 (Wide) 1 : 1.0 (Tele)
Angular Field of View	H	73.2° [56.9°]	57.5° [43.8°]	31.7° [23.8°]	Wide : 41.6° [31.3°] Tele : 7.2° [5.5°]
	V	56.9° [43.6°]	43.9° [33.1°]	23.6° [17.6°]	Wide : 31.3° [23.4°] Tele : 5.4° [4.1°]
Focusing Range		Adjusted by Camera			1.2 (m) - ∞ 4.0 (ft) - ∞
Mount		Special C-mount (CS-mount, 1"-32UN)			
Filter Size		None	ø46 mm, P = 0.75	ø46 mm, P = 0.75	ø67 mm, P = 0.75
Dimensions		ø43 x 43 mm 1-11/16" x 1-11/16"	ø52 x 55 mm ø2-1/16" x 2-3/16"	ø66 x 72.5 mm 2-5/8" x 2-7/8"	99(W) x 77(H) x 119(D) mm 3-1/2"(W) x 3"(H) x 4-5/8"(D)
Weights		85g (0.19 lbs.)	155g (0.34 lbs.)	255g (0.56 lbs.)	740g (1.63 lbs.)

- When using the above lenses with the camera, be sure to read instruction manual of lenses.
- [ ] indicates an angle used with the camera WV-BP120 Series.
- Dimensions and weights indicated are approximate.
- Specifications are subject to change without notice.

<Manual and Fixed Iris Lenses>

Models Specifications		WV-LM4R5A (Wide Angle)	WV-LM6B2 (Wide Angle)	WV-LM12B2 (Standard)	WV-LF4R5C3A (Wide Angle)	WV-LF9C3A (Standard)
Image Size		1/2" (6.4 (H) x 4.8 (V) mm)				1/3" (4.8 (H) x 3.6 (V) mm)
Focal Length		4.5 mm	6 mm	12 mm	4.5 mm	9 mm
Maximum Aperture Ratio		1 : 1.4	1 : 1.4	1 : 1.4	1 : 1.2	1 : 1.2
Angular Field of View	H	72.6° [56.9°]	56.8° [43.5°]	30.4° [22.8°]	56.4°	29.6°
	V	56.7° [43.6°]	43.5° [33.0°]	22.8° [17.1°]	43.3°	22.2°
Iris		Manual	Manual	Manual	Fixed	Fixed
Focusing Range		Adjusted by Camera				
Mount		Special C-mount (CS-mount, 1"-32UN)				
Filter Size		ø37.5 mm, P = 0.5	None	None	ø30.5 mm, P = 0.5	ø30.5 mm, P = 0.5
Dimensions		ø44 x 41 mm (ø1-3/4" x 1-5/8")	ø43 x 39 mm (ø1-11/16" x 1-9/16")	ø43 x 39 mm (ø1-11/16" x 1-9/16")	ø34.4 x 36 mm (ø1-3/8" x 1-7/16")	ø34.4 x 36 mm (ø1-3/8" x 1-7/16")
Weights		93g (0.20 lbs.)	45g (0.10 lbs.)	35g (0.08 lbs.)	29g (0.06 lbs.)	23g (0.05 lbs.)

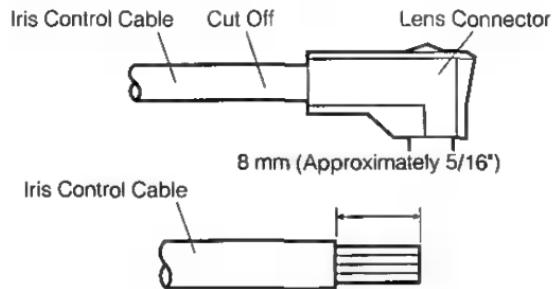
- [ ] indicates an angle used with the camera WV-BP120 Series.
- Dimensions and weights indicated are approximate.
- Specifications are subject to change without notice.

## 2. Installation of Auto Iris Lens Connector

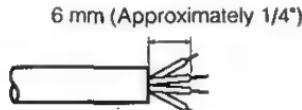
When you use a auto iris lens other than listed on pages 9, 10 and 11, for example a video servo ALC lens, install the lens connector (YFE4191J100) coming with the camera as follows.

**The following installation should be made by qualified service personnel or system installers.**

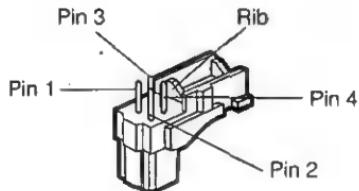
- (1) Cut off the iris control cable at the edge of lens connector and then cut off the outer cable cover as shown in the diagram.



- (2) Cut off the inner cable covers of the iris control cable as shown in the diagram.



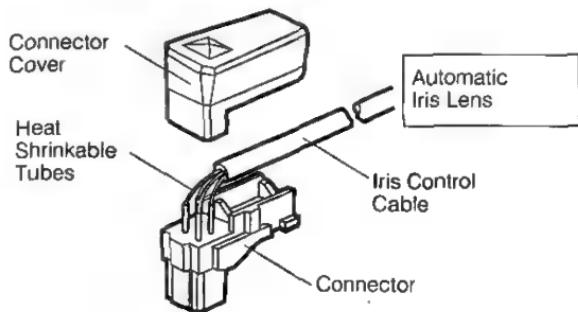
- (3) Put the heat shrinkable tubes or equivalent tubes on the inner cables of the iris control cable.
- (4) Solder the inner cable of the iris control cable at the pin-plug block according to the following pin assignment and cover the heat shrinkable tubes or equivalent tubes over the soldered area and heat on the tubes to shrink them.  
Pin 1 : Power source : +9V DC, 50mA Max.  
Pin 2 : Not used  
Pin 3 : Video signal : 0.7 V[p-p]/40 k $\Omega$   
Pin 4 : Shield, ground  
(Set the Lens Selection switch to the VIDEO Position)



(5) Both the connector cover and connector should be positioned to interlock.

**Note:**

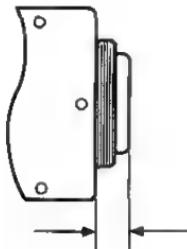
Cut off the rib on the connector, when the iris control cable is too thick and the connector cover and connector can not be interlocked.



### 3. Mounting the Lens

When you use the lens other than listed on pages 9, 10, 11 and 12, lens mount should be C-mount or special C-mount (CS-mount 1"-32UN) and lens weight should be less than 450g (0.99 lbs.). If not, both the lens and camera should be secured.

The protrusion of the rear of the lens should be as shown below.



C-mount : Less than 11.5 mm (7/16")  
CS-mount : Less than 7.2 mm (1/4")

**Caution:**

Always set the Flange-back adjusting ring to fully clockwise (C-mount side) by loosing screws on the ring before mounting the lens, otherwise the inner glass and CCD image sensor could be damaged by the lens.

- (1) Mount the lens by turning it clockwise onto the lens mount of the camera.
- (2) Connect the lens cable to the Auto Iris Lens Connector on the camera when an auto iris lens is used.
- (3) Set the Lens Selection Switch to the proper position as follows.

**DC:**

The mounted lens is one of the lenses listed on pages 9, 10 and 11 or one that requires the DC control signal for auto iris control.

**VIDEO:**

The mounted lens requires video signal for auto iris control.

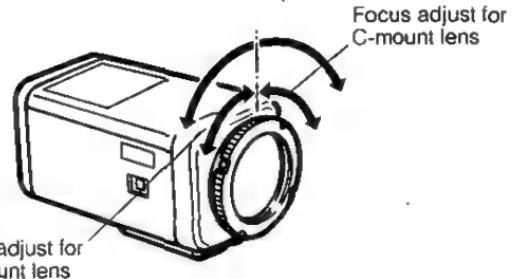
**Note:**

Refer to item on page 5 for the lens selection switch.

## FOCUS OR FLANGE-BACK ADJUSTMENT

The following adjustment should be made by qualified service personnel or system installers.

1. Loosen screws on the flange-back adjusting ring.



2. Turn the flange-back adjusting ring to the desired position.

**Caution:** Do not turn this ring too much to counter-clockwise as this could damage the inner glass and CCD image sensor.

3. Tighten the screws on the flange-back adjusting ring.

**Note:** Do not apply the excessive torque (0.5 kg.cm, recommended) to the screws on the flange-back adjusting ring.)

## INSTALLATION OF CAMERA

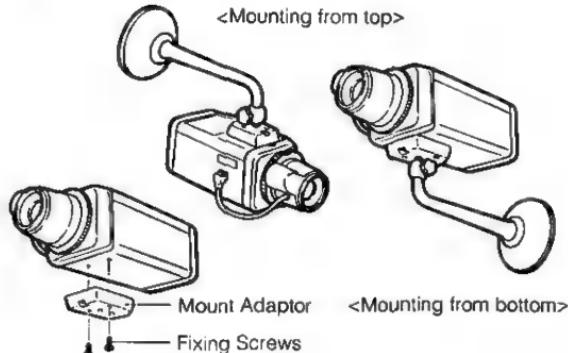
- **Mounting from the bottom**

This camera is originally designed to be mounted from the bottom as shown. The hole is the standard photographic pan-head screw size (1/4" - 20).

- **Mounting from the top**

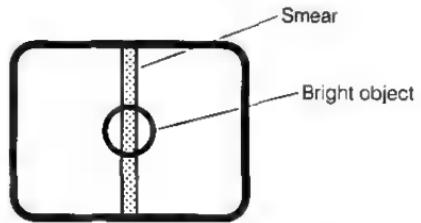
Remove the mount adaptor from the bottom of the camera by removing two fixing screws. Attach the mount adaptor to the top as shown in the diagram, then mount the camera on the mounting bracket.

**Make sure that two original screws are used when mounting the mount adaptor ; longer type screws may damage inner components.**



## PREVENTION OF BLOOMING AND SMEAR

When the camera is faced toward spot light or other bright lights and light reflecting objects, smear or blooming may appear. Therefore, the camera should be operated carefully in the vicinity of extremely bright objects to avoid smear or blooming.



## LENS MAINTENANCE AND CLEANING

1. Remove the lens connector
2. Remove the lens, and inspect the camera CCD faceplate through the lens mount opening to assure that the faceplate is free of smudges or particles of dirt.
3. Clean the CCD faceplate, if necessary, using lens tissue or a cotton tipped applicator and ethanol.
4. Install the new lens.

## SPECIFICATIONS

Pick-up Device:	512 (H) x 492 (V) pixels. Interline Transfer CCD
Scanning Area:	4.8 (H) x 3.6 (V) mm (Equivalent to scanning area of 1/3" pick-up tube)
Synchronization:	Line-locked mode or switchable Multiplexed Vertical Drive (VD2) automatically
Scanning System:	2 : 1 interlace
Scanning:	525 lines/60 fields/30 frames
Horizontal:	15.75 kHz
Vertical:	60 Hz
Horizontal Resolution:	380 lines
Video Output:	1.0 V[p-p] composite, 75Ω/BNC connector
Signal-to-Noise Ratio:	46 dB
Automatic Light compensation:	ALC : 1 : 10,000 with F1.4 ALC lens
Electronic Light Control:	Equivalent to continuous variable shutter speed between 1/60 s and 1/80,000 s
Minimum Illumination:	0.15 lx at F1.4, AGC ON
Lens Mount:	C-mount or special C-mount (CS-mount)
Ambient Operating Temperature:	-10°C - +50°C (14°F - 122°F)
Ambient Operating Humidity:	Less than 90%
Power Source:	WV-BP120      120V AC 60 Hz WV-BP124      24V AC 60Hz
Power Consumption:	WV-BP120      2.8W WV-BP124      2.7W
Dimensions (without lens):	67 (W) x 65 (H) x 123 (D) mm [2-5/8" (W) x 2-9/16" (H) x 4-13/16" (D)]
Weights (without lens):	WV-BP120      600 g (1.3 lbs.) WV-BP124      450 g (1.0 lbs.)

Weights and dimensions indicated are approximate.  
Specifications are subject to change without notice.

## **STANDARD ACCESSORIES**

ALC Lens Connector (YFE4191J100) ..... 1 pc.  
Body Cap ..... 1 pc.

## **OPTIONAL ACCESSORIES**

Lenses : WV-LA2.8, WV-LA6B2, WV-LA12B2  
WV-LA18, WV-LA36, WV-LA4510  
WV-LA608, WV-LA1208, WV-LA4R5C3A  
WV-LA9C3A, WV-LZ61/10  
WV-LZ81/6, WV-LZ81/10, WV-LZ83/6  
WV-LM4R5A, WV-LM6B2, WV-LM12B2  
WV-LF4R5C3A, WV-LF9C3A



# Panasonic

Broadcast & Television Systems Company

**Division of Matsushita Electric Corporation of America**  
**IMAGING SYSTEMS DIVISION**

**Executive Office:** One Panasonic Way 3E-7, Secaucus, New Jersey 07094

**Regional Offices:**

Northeast: 43 Hartz Way, Secaucus, NJ 07094 (201) 348-7303  
Southeast: 1225 Northbrook Parkway, Suite 1-160, Suwanee, GA 30174 (770) 338-6835  
Midwest: 1707 North Randall Road, Elgin, IL 60123 (847) 468-5200  
Southwest: 4500 Amon Carter Blvd., Fort Worth, TX 76155 (817) 685-1117  
Western: 6550 Katella Ave. 17A-5, Cypress, CA 90630 (714) 373-7265

**MATSUSHITA ELECTRIC OF CANADA LIMITED**

5770 Ambler Drive, Mississauga, Ontario, L4W 2T3 Canada (905)624-5010

**PANASONIC SALES COMPANY**

**DIVISION OF MATSUSHITA ELECTRIC OF PUERTO RICO, INC.**

San Gabriel Industrial Park, 65th Infantry Ave. KM. 9.5 Carolina, Puerto Rico 00630 (809)750-4300